

REMARKS

I. Introduction

The Office Action of October 2, 2007 has been received and the Examiner's comments carefully considered. Independent claims 1 and 6 have been amended so as to further define the composition of the claimed plating-pretreatment solution. Because this amendment is limited to changing the transitional phrase of these claims from "comprising" to "consisting essentially of", no new matter has been added by this amendment.

Claims 1-12 are currently pending in this application. Claims 1-2, 4-7, and 9-11 stand rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by U.S. Patent No. 6,284,309 to Bishop et al. (hereinafter "Bishop"). In addition, claims 3, 8, and 12 stand rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Bishop. Each of these rejections is respectfully traversed.

II. Rejections Under 35 U.S.C. § 102(b)

As mentioned above, claims 1-2, 4-7, and 9-11 stand rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Bishop. Bishop is directed to a method of preparing a substrate surface capable of forming a co-continuous bond with an organic material and includes the step of applying an etching composition to a copper substrate. The etching solution of Bishop includes an acid, an oxidizing agent, a copper complexing agent, and a copper complex.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The Bishop reference does not teach every element of claims 1-2, 4-7, and 9-11 and, therefore, does not anticipate the present invention.

In particular, independent claim 1 is directed to a plating-pretreatment solution consisting essentially of an organic sulfonic acid, thiourea, fluoroboric acid, and hypophosphorous acid. Independent claim 6 is directed to a method of using a similar solution to remove residual metals during a plating-pretreatment process. The transitional phrase "consisting essentially of" limits the scope of a claim to the specified materials or steps "and those that do not materially affect the basic and novel characteristic(s)" of the

claimed invention. In re Herz, 537 F.2d 549, 551-52, 190 USPQ 461, 463 (CCPA 1976); MPEP § 2111.03. The inclusion of an oxidizing agent, which is a necessary component of the etching solution in Bishop, would materially affect the basic and novel characteristics of the claimed solution. A basic and novel characteristic of the claimed solution is that the solution does not cause over-etching of a wiring pattern formed on the surface of a substrate. This characteristic of the claimed solution is recited, for example, on page 7 at lines 2-4. As described in the Background section of the subject application, the width of the conductive metal layer and, consequently, the width of the wiring pattern etched thereon have become increasingly small in order to mount electronic parts more densely. When traditional etching solutions are applied to these thin layers, excessive reactions between the solution and the substrate occur resulting in over-etching and an excessively thin or even damaged wire pattern. Applicants have developed a solution that avoids the problems of over-etching by, in one aspect, excluding from the solution an oxidizing agent which, as described in Bishop, acts to decompose the substrate surface. See Bishop, col. 3, lines 42-45. The addition of an oxidizing agent to the pretreatment solution of claim 1 would materially change this basic and novel characteristic of the Applicants' invention. However, it should be noted, the addition of a surface active agent, as recited in claims 4 and 9 and described in the specification beginning on page 12 at line 13, would not affect this basic and novel characteristic and, consequently, such a compound would not be excluded by the "consisting essentially of" language of claims 1 and 6. Therefore, the scope of claims 1 and 6 should be limited to solutions which do not contain an oxidizing agent.

Because Bishop's disclosure is limited to an etching solution that unequivocally contains, among other components, an oxidizing agent, Bishop cannot be said to teach or disclose each element of Applicants' invention. Thus, Bishop does not anticipate independent claims 1 and 6 or the claims which depend therefrom, namely 2-5 and 7-12. Therefore, reconsideration and withdrawal of the rejection of claims 1-2, 4-7, and 9-11 under 35 U.S.C. § 102(b) is respectfully requested.

III. Rejections Under 35 U.S.C. § 103(a)

Claims 3, 8, and 12 stand rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over Bishop. In order to expedite examination, and in light of the above comments regarding the failure of Bishop to properly anticipate independent claims 1 and 6

under 35 U.S.C. § 102(b), the following argument will be premised on the assumption that independent claims 1 and 6 additionally stand rejected under 35 U.S.C. § 103(a) in light of Bishop. However, as explained below, claims 1 and 6, and all of the claims that depend therefrom, would not have been obvious to one of ordinary skill in the art and thus any rejection under 35 U.S.C. § 103(a) would be improper.

As discussed above, the etching solution taught by Bishop necessarily includes an oxidizing agent. The pretreatment solution recited by Applicants in claims 1 and 6, on the other hand, cannot contain such an agent since an oxidizing agent would materially change one of the basic and novel characteristics of Applicants' invention, namely its ability to remove residual metals without over-etching the wiring pattern. In light of these distinctions between the cited art and the subject invention, establishing a *prima facie* case of obviousness requires that there be some articulated reason why one skilled in the art would find it obvious to modify Bishop in such a manner as to arrive at Applicants' invention.

As discussed above, Bishop is directed to a method of forming a substrate surface capable of making a co-continuous bond (defined in col. 2, lines 15-17) by applying an etching composition to a copper substrate. According to Bishop, application of their etching solution will cause a physical roughening of the surface of the substrate, creating micropores, and, when an organic material is applied to this roughened surface, the organic material can flow into the micropores creating a bond. Bishop is not concerned with the removal of residual metals or with treating substrates containing wire patterns but is limited to preparing a substrate for bonding to an organic material.

Applicants, on the other hand, have invented a pretreatment solution that is capable of removing residual metals, like nickel, chromium, copper, etc. from the surface of a substrate on which a wiring pattern has already been formed without causing over-etching of the wiring pattern. Applicants' solution is applied after the wire pattern has been etched into the substrate but before the substrate is subjected to a plating process and provides new benefits in the field that were not expected or anticipated in light of, for instance, Bishop. For example, in Example 1, Applicants etched comb-shaped pattern electrodes onto a substrate and then immersed the substrate into their inventive plating-pretreatment solution. After subsequently plating the substrate, a constant voltage was applied between the electrodes. After over 1000 hours, there had been no change in the insulation resistance of the substrate. Looking now to Comparative Example 1, three substrates were etched in the same manner

but were not immersed in the plating-pretreatment solution. The insulation resistance of these substrates had lowered after the passage of only 550 hours, 366 hours, and 410 hours, respectively. Similar results were experienced with Sample 2.

A *prima facie* case of obviousness simply cannot be established here because there is nothing in the prior art that would lead one of ordinary skill to modify Bishop in order to create Applicants' inventive solution. Bishop is directed to a solution used to roughen the surface of a metal substrate in order to create micropores. An oxidizing agent is essential to this purpose and in this way Bishop actually teaches away from Applicants' claimed solution. One skilled in the art reading Bishop would not expect that a solution without the oxidizing agent would have any beneficial use, much less provide the benefits discovered by Applicants. Simply stated, there is no rationale sufficient to establish that one skilled in the art would find it obvious to modify Bishop by removing the oxidizing agent since there is no expectation or understanding that the resulting solution would have any beneficial properties. Consequently, Applicants respectfully submit that claims 1-12 are not obvious in view of the cited art and are in a condition for allowance.

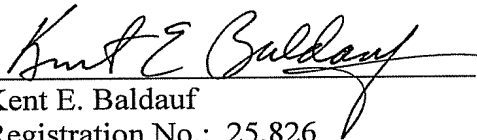
IV. Conclusion

In light of the foregoing amendments and remarks, Applicants submit that pending claims 1-12 are patentable over the cited documents and are in condition for allowance. Accordingly, reconsideration of the rejections and allowance of pending claims 1-12 are respectfully requested.

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Should the Examiner have any questions regarding any of the foregoing, or wish to discuss this application in further detail to advance prosecution, the Examiner is invited to contact Applicants' undersigned representative at the telephone number provided below.

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